



[4910-13]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No.FAA-2013-1038; Special Conditions No. 25-549-SC]

Special Conditions: Bombardier Aerospace, Models BD-500-1A10 and BD-500-1A11 series airplanes; Flight Envelope Protection: High-speed Limiting

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions.

SUMMARY: These special conditions are issued for the Bombardier Aerospace Models BD-500-1A10 and BD-500-1A11 series airplanes. These airplanes will have a novel or unusual design feature associated with an electronic flight control system that contains fly-by-wire control laws, including envelope protections, for the overspeed protection and roll-limiting function. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for this design feature. These special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

EFFECTIVE DATE: [Insert date 30 days after date of publication in the Federal Register].

FOR FURTHER INFORMATION CONTACT: Joe Jacobsen, FAA, Airplane and Flight Crew Interface Branch, ANM-111, Transport Airplane Directorate, Aircraft Certification Service, 1601 Lind Avenue SW., Renton, Washington, 98057-3356; telephone 425-227-2011; facsimile 425-227-1149.

SUPPLEMENTARY INFORMATION:

Background

On December 10, 2009, Bombardier Aerospace applied for a type certificate for their new Models BD-500-1A10 and BD-500-1A11 series airplanes (hereafter collectively referred to as “CSeries”). The CSeries airplanes are swept-wing monoplanes with an aluminum alloy fuselage sized for 5-abreast seating. Passenger capacity is designated as 110 for the Model BD-500-1A10 and 125 for the Model BD-500-1A11. Maximum takeoff weight is 131,000 pounds for the Model BD-500-1A10 and 144,000 pounds for the Model BD-500-1A11.

The longitudinal control law design of the Bombardier CSeries airplanes incorporates an overspeed protection system in the normal mode. This mode prevents the pilot from inadvertently or intentionally exceeding a speed approximately equivalent to the maximum speed for stability characteristics (V_{FC}) or attaining demonstrated flight diving speed (V_{DF}). Current Title 14, Code of Federal Regulations (14 CFR) part 25 standards did not envision a high-speed limiter that might preclude or modify flying qualities assessments in the overspeed region.

Type Certification Basis

Under the provisions of 14 CFR 21.17, Bombardier Aerospace must show that the CSeries airplanes meet the applicable provisions of part 25 as amended by Amendments 25-1 through 25-129 thereto.

If the Administrator finds that the applicable airworthiness regulations (i.e., 14 CFR part 25) do not contain adequate or appropriate safety standards for the CSeries airplanes because of a novel or unusual design feature, special conditions are prescribed under the provisions of § 21.16.

Special conditions are initially applicable to the model for which they are issued. Should the type certificate for that model be amended later to include any other model that incorporates the same or similar novel or unusual design feature, the special conditions would also apply to the other model under § 21.101.

In addition to the applicable airworthiness regulations and special conditions, the CSeries airplanes must comply with the fuel vent and exhaust emission requirements of 14 CFR part 34 and the noise certification requirements of 14 CFR part 36, and the FAA must issue a finding of regulatory adequacy under § 611 of Public Law 92-574, the “Noise Control Act of 1972.”

The FAA issues special conditions, as defined in 14 CFR 11.19, in accordance with § 11.38, and they become part of the type-certification basis under § 21.17(a)(2).

Novel or Unusual Design Features

The CSeries airplanes will incorporate the following novel or unusual design features: An electronic flight control system that contains fly-by-wire control laws, including envelope protections, for the overspeed protection and roll-limiting function. Current part 25 requirements do not contain appropriate standards for high-speed protection systems.

Discussion

The overspeed protection functionality includes multifunction spoilers (MFS) that will automatically deploy as speed brakes once the airspeed exceeds a small tolerance above maximum operating limit speed (V_{mo}/M_{mo}); the MFS will retract automatically when speed is subsequently reduced. Special conditions are necessary in addition to the requirements of § 25.143 for the operation of the high-speed protection. The general intent is that the overspeed protection does not impede normal maneuvering and speed control, and that the overspeed protection does not restrict or prevent emergency maneuvering.

These special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

Discussion of Comments

Notice of proposed special conditions No. 25-13-38-SC for the Bombardier CSeries airplanes was published in the Federal Register on December 11, 2013 (78 FR 75284). We received one comment in favor of the proposed special conditions as written.

Applicability

As discussed above, these special conditions are applicable to the Models BD-500-1A10 and BD-500-1A11 series airplanes. Should Bombardier Aerospace apply at a later date for a change to the type certificate to include another model incorporating the same novel or unusual design feature, the special conditions would apply to that model as well.

Conclusion

This action affects only certain novel or unusual design features on two model series of airplanes. It is not a rule of general applicability.

List of Subjects in 14 CFR Part 25

Aircraft, Aviation safety, Reporting and recordkeeping requirements.

The authority citation for these special conditions is as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701, 44702, 44704.

The Special Conditions

Accordingly, pursuant to the authority delegated to me by the Administrator, the following special conditions are issued as part of the type certification basis for the Bombardier Aerospace Models BD-500-1A10 and BD-500-1A11 series airplanes.

Flight Envelope Protection – High-speed Limiting

1. In addition to § 25.143, the following requirements apply: Operation of the high-speed limiter during all routine and descent procedure flight must not impede normal attainment of speeds up to overspeed warning.

Issued in Renton, Washington, on April 22, 2014.

Jeffrey E. Duven
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Aircraft Certification Service

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